

IN THE CLAIMS:

Claims 1-12 are amended herein. Claims 13-17 are added. All pending claims are produced below. In addition, the status of each is also indicated below and appropriately noted as “Original”, “Currently Amended”, “Canceled”, “New”, “Withdrawn”, “Previously Presented”, and “Not Entered” as requested by the Office.

1. (Currently Amended) A method for accessing a plurality of dynamic random access memory (DRAM) devices in parallel, each DRAM device having at least one memory bank, ~~in a parallel packet processor~~, the method comprising:
~~partitioning a plurality of data words into data segments, the plurality of data words comprising a first data word and a second data word, each of the data segments being associated with one of the plurality of data words;~~
determining a distribution of ~~the~~ data segments of the first and second data words in
~~to~~ a plurality of memory banks, the plurality of memory banks being among the memory banks of the plurality of DRAM devices, ~~at least one data segment associated with the first word to be stored in parallel with at least one data segment associated with the second word;~~
determining a sequence of retrieving the data segments based on the plurality of
memory banks storing in parallel the data segments into the plurality of
memory banks based on the distribution;
retrieving the data segments ~~associated with a requested data word~~ in parallel from the plurality of memory banks ~~of the plurality of DRAM devices~~ based on the

distribution and the sequence, ~~the requested data word being one of the~~
~~plurality of data words~~; and
reassembling the retrieved data segments into the first and second data words
~~requested data word~~.

2. (Currently Amended) The method of claim 1 further comprising:
receiving a retrieval request for the first data word and a retrieval request for the
second data word, wherein the sequence can be different from the order of the
retrieval requests received ~~plurality of retrieval requests~~, ~~at least one of the~~
~~retrieval requests being associated with the requested data word~~, and
~~wherein retrieving the data segments associated with the requested data word in~~
~~parallel comprises retrieving the data segments associated with the requested~~
~~data word in parallel from the memory banks of the plurality of DRAM~~
~~devices based on the distribution~~, ~~the retrieving being in an order of the~~
~~plurality of retrieval requests received~~.
3. (Currently Amended) The method of claim 1 wherein at least one of the first and
second data words ~~at least one of the plurality of data words~~ has a maximum word
size.
4. (Currently Amended) The method of claim 1 wherein at least one of the first and
second data words ~~at least one of the plurality of data words~~ includes a cell of a
packet.

5. (Currently Amended) The method of claim 1 wherein at least one of the first and second data words ~~at least one of the plurality of data words~~ has a fixed word size.
6. (Currently Amended) The method of claim 1 wherein at least one of the first and second data words ~~at least one of the plurality of data words~~ has a variable word size.
7. (Currently Amended) The method of claim 1, further comprising:
partitioning the first and second data words into data segments; and
storing the data segments in parallel into the plurality of memory banks based on the
distribution.
~~wherein storing in parallel the data segments into the plurality of memory banks~~
~~based on the distribution further comprises:~~
~~determining an in-bank burst length based upon a maximum word size, a total number~~
~~of memory banks in the plurality of DRAM devices, and a data width of an~~
~~individual memory bank, and~~
~~storing the data segments in a burst having the in-bank burst length.~~
8. (Currently Amended) The method of claim 1 wherein the plurality of memory banks
comprise at least one memory bank from each DRAM device ~~storing in parallel the~~
~~data segments into the plurality of memory banks based on the distribution further~~
~~comprises:~~

~~selecting a memory bank in each of the plurality of DRAM devices for each of the data segments, and~~
~~storing a data segment in selected memory bank in parallel, the data segment being one of the partitioned data segments.~~

9. (Currently Amended) The method of claim 1, wherein the sequence of retrieving the data segments within a first DRAM device is independent from the sequence of retrieving the data segments within a second DRAM device, the first and second DRAM devices being among the plurality of DRAM devices, the method further comprising:
scheduling the storing of the data segments independently within a DRAM device.
10. (Currently Amended) The method of claim 1 wherein retrieving the data segments ~~associated with the requested data word~~ in parallel further comprises:
determining a starting memory bank in each of the plurality of DRAM devices storing at least one of the data segments ~~associated with the requested data word~~; and
retrieving the reading data segments associated with the requested data word in parallel from the starting memory banks.
11. (Currently Amended) A system for providing fast access to dynamic random access memory (DRAM) devices, the system comprising:
a plurality of DRAM devices, each device having at least one memory bank;
a processor chip set; and

a memory unit comprising a computer usable medium ~~persistent memory~~ that includes microcode for execution by the processor ~~chipset~~ to cause the processor ~~chipset~~ to perform the operations of:

~~partitioning a plurality of data words into data segments, the plurality of data words comprising a first data word and a second data word, each of the data segments being associated with one of the plurality of data words;~~

determining a distribution of the data segments of the first and second data words in to a plurality of memory banks, the plurality of memory banks being among the memory banks of the plurality of DRAM devices, ~~at least one data segment associated with the first word to be stored in parallel with at least one data segment associated with the second word;~~

determining a sequence of retrieving the data segments based on the plurality of memory banks ~~storing in parallel the data segments into the plurality of memory banks based on the distribution;~~

retrieving the data segments ~~associated with a requested data word~~ in parallel from the plurality of memory banks ~~of the plurality of DRAM devices~~ based on the distribution and the sequence, ~~the requested data word being one of the plurality of data words; and~~

reassembling the retrieved data segments into the first and second data words ~~requested data word.~~

12. (Currently Amended) The system of claim 11, wherein the computer usable medium ~~persistent memory~~ further comprises microcode for execution by the processor ~~chipset~~ to cause the processor ~~chipset~~ to perform the operation of:
partitioning the first and second data words into data segments; and
storing the data segments in parallel into the plurality of memory banks based on the
distribution ~~scheduling the storing of the data segments independently within~~
~~a DRAM device.~~
13. (New) The method of claim 7, wherein storing the data segments in parallel into the plurality of memory banks based on the distribution further comprises:
determining an in-bank burst length based upon a maximum word size, a total number
of the plurality of memory banks, and a data width of an individual memory
bank, and
storing the data segments in parallel into the plurality of memory banks based on the
distribution in a burst having the in-bank burst length.
14. (New) The method of claim 1, wherein the data segments stored in the same memory bank are retrieved in one burst.
15. (New) The method of claim 1, wherein the sequence is determine by the load among the plurality of memory banks.

16. (New) The method of claim 1, wherein the sequence is determined by the precharge situation of the plurality of memory banks.
17. (New) A system for providing fast access to dynamic random access memory (DRAM) devices, the system comprising:
- a plurality of DRAM devices, each device having at least one memory bank;
 - a storage distribution control module configured to partition a data word and a second data word into data segments and allocate the data segments in the plurality of DRAM devices;
 - a scheduler associated with each DRAM device, configured to determine a storage schedule to store the data segments allocated to the associated DRAM device in the memory banks in the DRAM device, and to determine a retrieval schedule to retrieve the data segments stored in the associated DRAM device from the memory banks in the associated DRAM device based on the memory banks in the associated DRAM device, the storage schedule and the retrieval schedule being independent of the storage schedules and retrieval schedules of other schedulers; and
 - a retrieval control module configured to retrieve the data segments in parallel from the plurality of DRAM devices, and to reassemble the retrieved data segments into the first and second data words.